

REMARKS

Claims 1-19, 21 and 23-25 are pending in the application.

Claims 1-19, 21 and 23 are rejected under 35 U.S.C. § 103(a).

Claims 1, 14 and 23 are amended.

Claims 24 and 25 are added.

No new matter is added.

Applicants request reconsideration and allowance of the claims in light of the above amendments and following remarks.

Claim Rejections – 35 USC § 103

Claims 1-7, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,133,637 issued to Hikita et al. (hereinafter “Hikita”) in view of Japanese Patent No. 63-240053 issued to Kondo et al. (hereinafter “Kondo”) and U.S. Patent No. 6,099,783 issued to Scranton et al. (hereinafter “Scranton”) and U.S. Patent App. Pub. No. 2002/0004258 to Nakayama et al. (hereinafter “Nakayama”). Applicants respectfully traverse this rejection.

Amended claim 1 recites, among other elements, wherein the soft element directly contacts the mold resin.” Support for this amendment can be found at, for example, FIGS. 4B, 5B, 6B, 7B, 8B and 9B of the specification as originally presented. Applicants respectfully submit the combination of Hikita in view of Kondo, Scranton and Nakayama fails to teach or suggest at least this feature as recited in claim 1.

For example, FIG. 9 of Hikita illustrates wherein the adhesive 18 is disposed vertically between the IC chips 14 and 16, wherein the inner package 26 surrounds the peripheral portions of the adhesive 18 not disposed vertically between the IC chips 14 and 16 and wherein the outer package 22 directly contacts inner package 26 and the IC chip 16. In view of the above, it is clear that the adhesive 18 directly contacts the IC chips 14 and 16 and the inner package 26 whereas the outer package 22 directly contacts the inner package 26 and the IC chip 16. Accordingly, it is clear that the adhesive 18 of Hikita does not directly contact the outer package 22. None of Kondo, Scranton or Nakayama teaches or suggests the obviousness of modifying Hikita to provide the adhesive 18 in direct contact with the outer package 22.

For at least these reasons, claim 1 is not rendered obvious by the combination of Hikita in view of Kondo, Scranton and Nakayama.

Claims 2-7, 21 and 23 depend from claim 1 and, therefore, include all of the elements recited in claim 10. Accordingly, claims 2-7, 21 and 23 are not rendered obvious by the combination Hikita in view of Kondo, Scranton and Nakayama at least by virtue of their dependency from claim 1.

Further rejecting claims 2 and 3, the Office Action interprets the inner package 26 of Hikita as reading on the claimed soft element. The soft element recited in claims 2 and 3 is provided without a filler. However, Hikita discloses that the inner package 26 “is formed of ... epoxy resin *with a filler* to increase its moisture resistance.” (*emphasis added*) Accordingly, the inner package 26 of Hikita cannot read on the soft element recited in claims 2 and 3.

For at least these additional reasons, claims 2 and 3 are not rendered obvious by the combination of Hikita in view of Kondo, Scranton and Nakayama.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hikita in view of Kondo, Scranton and Nakayama as applied to claim 1 above, and further in view of U.S. Patent No. 6,569,709 issued to Derderian (hereinafter “Derderian”). Applicants respectfully traverse this rejection. Applicants respectfully traverse this rejection.

Claims 8 and 9 depend from claim 1 and, therefore, include all of the elements recited in claim 1. As shown above, the combination of Hikita in view of Kondo, Scranton and Nakayama fails to render claim 1 obvious. Derderian does not teach or suggest the obviousness of modifying Hikita to provide the adhesive 18 in direct contact with the outer package 22. Accordingly, claims 8 and 9 are not rendered obvious by the combination Hikita in view of Kondo, Scranton, Nakayama and Derderian at least by virtue of their dependency from claim 1.

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,215,182 issued to Ozawa et al. (hereinafter “Ozawa”) in view of Kondo and Scranton, and further in view of Nakayama. Applicants respectfully traverse this rejection.

Rejecting claim 10, the Office Action asserts it would have been obvious to modify the package of Ozawa in view of Kondo and Scranton “by forming chips having coplanar side surfaces as taught by Nakayama to extend resin along both sides of the chip for mounting to a substrate.” Applicants respectfully disagree.

FIG. 5 of Ozawa illustrates wherein the side surfaces of each of the first, second and third semiconductor elements 22, 23 and 24, respectively, are stepped. Accordingly, the first, second and third electrodes 27, 28 and 29, respectively, are disposed adjacent to an edge of a corresponding semiconductor element. The first, second and third electrodes 27, 28 and 29 are electrically connected to each other via wires 30, 31 and 32. At column 6, lines 36-45, Ozawa states:

...since the first to the third wires 30 through 32 are connected to the substrate 33 via relays of the stacked semiconductor elements 24 and 23, the lengths of each of the wires 30 through 32 can be shortened and thereby heights of wire loops thereof... can also be lowered. Accordingly, space for the wire loops within the semiconductor device 20A can be designed smaller, and thereby the miniaturization (in height) of the semiconductor device can be achieved.

Additionally, Ozawa teaches at column 6, lines 46-53:

...only one of the wires 32 is coupled to a corresponding one of the bonding pads 34 provided on the substrate 33. For this reason, each of the bonding pads 34 can be made smaller compared to the conventional bonding pads 14... to each of which the plurality of wires 10 through 12 is coupled. As a result, the semiconductor device 20A can be miniaturized.

In view of the above, it is clear that the semiconductor device 20A of Ozawa can be miniaturized because the first, second and third wires 30, 31 and 32 are electrically connected to the substrate 33 via the second and third semiconductor elements 24 and 23. It is also clear that only the third wire 32 is coupled to a bonding pad 34 on the substrate 33 (thereby enabling the semiconductor device 20A of Ozawa to be miniaturized) because the first, second and third wires 30, 31 and 32 are electrically connected to the substrate 33 via the second and third semiconductor elements 24 and 23. Lastly, it is clear that the first, second and third wires 30, 31 and 32 are electrically connected to the substrate 33 via the second and third semiconductor elements 24 and 23 because the side surfaces of the first, second and third semiconductor elements 22, 23 and 24 are stepped.

If the side surfaces of any of the first, second or third semiconductor elements 22, 23 or 24 are coplanar with one another, then they cannot be stepped. If the side surfaces of the first, second and third semiconductor elements 22, 23 and 24 are not stepped, then the first, second and third wires 30, 31 and 32 cannot be electrically connected to the substrate 33 via the second and third semiconductor elements 24 and 23. If the first, second and third wires 30, 31 and 32 cannot be electrically connected to the substrate 33 via the second and third semiconductor

elements 24 and 23, then miniaturization of the semiconductor device 20A of Ozawa will not be achieved as described by Ozawa.

In view of the above, and even if “mounting to a substrate” could be achieved by modifying the semiconductor device 20A of Ozawa in view of Kondo and Scranton using Nakayama as proposed, it would nevertheless be “obvious” to do so because the proposed modification would eliminate the miniaturization of the semiconductor device 20A achieved by Ozawa. That is, the proposed combination of Ozawa in view of Kondo, Scranton and Nakayama would render the semiconductor device 20A of Ozawa unsatisfactory for its intended purpose.

For at least these reasons, claim 10 is not rendered obvious by the combination of Ozawa in view of Kondo, Scranton and Nakayama.

Claims 11-13 depend from claim 10 and, therefore, include all of the elements recited in claim 10. Accordingly, claims 11-13 are not rendered obvious by the combination of Ozawa in view of Kondo, Scranton and Nakayama at least by virtue of their dependency from claim 10.

Claims 14-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hikita in view of Scranton and Nakayama. Applicants respectfully traverse this rejection.

Rejecting claim 14, the Office Action asserts it would have been obvious to “modify the soft element of ... [Hikita] by using an encapsulant material having no filler as taught by Scranton to form a soft element having a putty-like property.” Applicants respectfully disagree.

For example, at column 6, lines 25-27, Hikita discloses that the inner package 26 “is formed of ... epoxy resin *with a filler* to increase its moisture resistance.” (*emphasis added*)

In view of the above, and even if the inner package 26 of Hikita could be modified to have a “putty-like property” as proposed, it would nevertheless be “obvious” to modify the inner package 26 to have no filler because such a modification would involve removing the filler expressly provided for by Hikita. As a result of the proposed modification, Applicants respectfully submit that the moisture resistance of the inner package 26 without filler would be decreased relative to the moisture resistance of the inner package 26 with filler. Thus, the susceptibility of chips 14 and 16 to moisture would necessarily be increased, rendering the semiconductor device 10 of Hikita unsatisfactory for its intended purpose. For at least these additional reasons, Applicants respectfully submit that there is no suggestion or motivation to make the proposed combination of Hikita in view of Scranton.

The arguments presented in preceding paragraphs are substantively identical to the arguments presented at page 8, line 24-page 9, line 3 of Applicants' response filed August 3, 2007. However, the Office Action fails to answer the substance of these arguments, let alone address them. If the rejection of claim 14 is to be maintained, Applicants respectfully request the substance of these arguments be answered. Otherwise, Applicants request withdrawal of the rejection of claim 14.

In the "Response to Arguments" section of the Office Action dated June 4, 2007, it is asserted that the current rejection of claim 14 does not rely on the embodiment shown in FIG. 9 (which incorporates the inner package 26) but, rather relies on the embodiment shown in FIGS. 1-6 and "described in and beginning in column 4 and ending at line 55 of column 5." Applicants respectfully submit, however, that the current rejection of claim 14 relies upon the embodiment shown in FIG. 9. To wit, the current rejection of claim 14 states that "Hikita... disclose... forming a soft element (26) on at least one side of at least one of the at least two chips...." The embodiment shown in FIGS. 1-6 of Hikita does not disclose the inner package 26. Rather, the inner package 26 is described only with respect to the embodiment shown in FIG. 9. Moreover, Hikita discloses at column 6, lines 20-25 that the embodiment shown in FIG. 9 "is structured similarly to the embodiment of FIG. 1 to FIG. 6 except that an inner package 26 is formed...." Accordingly, while a portion of the rejection of claim 14 relies upon a disclosure that is common to both the embodiment shown in FIGS. 1-6 and the embodiment shown in FIG. 9, the rejection, when viewed in its entirety, relies upon the embodiment shown in FIG. 9.

Applicants also note that the rejection of claim 14 asserts that "it would have been obvious ... to modify the soft element of Hikita by using an encapsulant material... as taught by Scranton...." Such a proposed modification to the teachings of Hikita is further evidence that claim 14 was rejected based on the embodiment shown in FIG. 9.

Applicants also note that claims 15 and 16, which depend from claim 14, were also rejected based on the embodiment shown in FIG. 9. This is further evidence that claim 14 was rejected based on the embodiment shown in FIG. 9.

In view of the above, Applicants respectfully submit that the rejection of claim 14 is based on the embodiment shown in FIG. 9 – not the embodiment shown in FIGS. 1-6. Accordingly, the arguments presented above with respect to the rejection of claim 14 are valid and persuasive for showing that the combination of Hikita in view of Scranton fails to render

claim 14 obvious. See, e.g., the Office Action dated June 4, 2007 at the last three lines of page 10.

The arguments presented in preceding paragraphs are substantively identical to the arguments presented at page 8, line 24–page 9, line 3 of Applicants’ response filed August 3, 2007. However, the Office Action fails to answer the substance of these arguments, let alone address them. If the rejection of claim 14 is to be maintained, Applicants respectfully request the substance of these arguments be answered. Otherwise, Applicants request withdrawal of the rejection of claim 14.

Claims 15 and 16 depend from claim 14 and, therefore, include all of the elements recited in claim 14. Accordingly, claims 15 and 16 are not rendered obvious by the combination of Hikita in view of Scranton and Nakayama at least by virtue of their dependency from claim 14.

Claims 17-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hikita in view of Scranton and Nakayama, and further in view of Kondo. Applicants respectfully traverse this rejection.

Claims 17-19 depend from claim 14 and, therefore, include all of the elements recited in claim 14. As shown above, the combination of Hikita in view of Scranton and Nakayama fails to render claim 14 obvious. Kondo does not teach or suggest the obviousness of modifying Hikita to provide the inner package 26 to not have filler. Accordingly, claims 17-19 are not rendered obvious by the combination Hikita in view of Scranton, Nakayama and Kondo at least by virtue of their dependency from claim 14.

New Claims

Support for new claim 24 can be found at, for example, FIGS. 4B, 5B, 6B, 7B, 8B and 9B of the specification as originally presented. Applicants respectfully submit the combination of Hikita in view of Kondo, Scranton and Nakayama fails to teach or suggest the features recited in claim 24.

For example, FIG. 9 of Hikita illustrates wherein an upper surface the IC chip 14 is exposed by the IC chip 16. Accordingly, thin gold wires W electrically connect bumps 14b formed on the IC chip 14 to the lead terminals 12b. If side surfaces of the IC chips 14 and 16 were coplanar, then the upper surface the IC chip 14 would not be exposed by the IC chip 16. If

the upper surface the IC chip 14 is not exposed by the IC chip 16, then the thin gold wires W would not electrically connect the bumps 14b to the lead terminals 12b.

In view of the above, and even if "mounting to a substrate" could be achieved by modifying the semiconductor device 10 of Hikita using Nakayama as proposed by the Office Action, it would nevertheless be "obvious" to do so because the proposed modification would prevent the thin gold wires W from electrically connecting the bumps 14b to the lead terminals 12b. As a result, the semiconductor device 10 of Hikita would be rendered unsatisfactory for its intended purpose.

For at least these reasons, claim 24 is not rendered obvious by the combination of Ozawa in view of Hikita in view of Kondo, Scranton and Nakayama.

Support for new claim 25 can be found at, for example, FIGS. 4B and 5B.

CONCLUSION

For the foregoing reasons, reconsideration and allowance of the pending claims of the application as amended is requested. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

MARGER JOHNSON & McCOLLOM, P.C.



Hosoon Lee
Reg. No. 56,737

MARGER JOHNSON & McCOLLOM, P.C.
210 SW Morrison Street, Suite 400
Portland, OR 97204
503-222-3613
Customer No. 20575